

CHAPTER 4

ANALYSIS OF ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

This chapter discusses environmental consequences of the Proposed Action and of the No Action Alternative. It also discusses potential cumulative impacts (i.e., those impacts resulting from the development of the Proposed Action added to existing and ongoing activities in the vicinity of the Project Area). Environmental consequences are discussed for each resource in the following sections. Mitigation measures and residual impacts are discussed, where appropriate, and have been summarized in **Appendix B**. Mitigation measures are recommended for some resources to further minimize impacts. The Proposed Action has been developed to minimize impacts.

An environmental consequence or impact is defined as a modification in the existing environment brought about by the Proposed Action or an alternative. Impacts can be a primary result of the action (direct) or a secondary result (indirect), and can be permanent or long-lasting (long-term) or temporary and of short duration (short-term). Impacts can vary in degree from only a slight discernible change to a total change in the environment.

Short-term impacts are effects on the environment that occur during and immediately after well pad construction, drilling, completion, testing, and/or production facility installation, and last up to one to two years, or until completion of interim reclamation. Although short in duration, such impacts can be obvious and disruptive. For this project, short-term impacts are defined as lasting two years or less. Long-term impacts are changes made in the environment during construction and operation of the project that remain longer than two years and perhaps for the life of the project (approximately 20 years) and beyond.

4.1 GEOLOGY, MINERALS, AND PALEONTOLOGY

4.1.1 *The Proposed Action*

Construction using techniques approved by the BLM to minimize disturbance would result in some impact to local topography, including cut and fill operations for the well pads, facilities, and road construction. Currently, and in the foreseeable future, there are no known exploitable mineral resources within the vicinity of the Proposed Action. Development of the Proposed Action would have minimal impacts to local topography and none to mineral resources.

The Project Area is underlain by rock layers not known to exhibit high probabilities of containing significant vertebrate fossils. Applicant-committed mitigation measures, discussed in **Appendix B**, would minimize the possibility of loss in the event of discovery of significant fossils.

4.1.2 The No Action Alternative

Impacts would be similar to the Proposed Action, with the exception that no modifications to local topography would occur. No negative impacts to paleontological resources would occur.

4.2 AIR QUALITY

Issues relating to impacts from the Proposed Action were concerned with possible negative impacts to air quality resulting from increased emissions from drilling and production activities.

4.2.1 The Proposed Action

Air quality impacts would result from particulates emissions from unpaved roads and well pads associated with construction and ongoing maintenance operations, from vehicle emissions during construction and operation, and from aspects of the gas and condensate production phase. The latter consist principally of:

- ∅ Three-phase separation (water, gas, and condensate)
- ∅ glycol dehydration and
- ∅ condensate storage (including flashing emissions).

Recently, the BLM has issued a Final Environmental Impact Statement for the Desolation Flats Natural Gas Development Project (BLM, 2004). The proposed project is located approximately 60 miles south of the Project Area and targets similar productive horizons. Detailed air quality modeling was conducted for Alternative A of this NEPA analysis. Alternative A consists of the drilling and production of 592 gas wells at 555 locations with an assumed 65 percent production rate, leading to 385 producing wells. Planned gas compression for the field development is estimated at 32,000 horsepower. Modeling was conducted at sub-grid, near-field (to 50 km) and far-field (400 by 500 km study area) levels.

The results of modeling studies indicate that no adverse impacts to air quality from the Desolation Flats Project alone are anticipated as a result of development of any alternative for sub-grid or near-field domains. The Proposed Action will comply with all state and national air quality standards. Studies done for the Desolation Flats FEIS suggest the possibility of some contribution to far-field visibility reduction within certain Class I airsheds. Studies indicate that development associated with the Desolation Flats Project would contribute to far field visibility impacts when combined with all other human development in the area. The Proposed Action would not materially detract from the area's far field visibility. Localized increases in criteria pollutants would occur, but maximum concentrations would be below applicable federal and state standards.

Because the Proposed Action does not involve additional gas compression, the most comparable modeling results from Desolation Flats are those based on individual well studies. Near-field modeling results from the Desolation Flats Final EIS are illustrated in **Table 4.1** and **Table 4.2**.

Table 4.1 Near-Field Ambient Air Quality Impacts ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Period	Total Project Impact	Monitored Back-ground Level	Maximum Impact Plus Back-ground	National Ambient Air Quality Standard	Wyoming Ambient Air Quality Standard	Colorado Ambient Air Quality Standard	Percentage of Most Stringent Ambient Air Quality Standard
NO ₂	Annual	1.51	3.4	4.91	100	100	100	5%
SO ₂	3-hour	0.15	29	29.15	1,300	1,300	700	4%
SO ₂	24-hour	0.08	18	18.08	365	260	365	7%
SO ₂	Annual	0.02	5	5.02	80	60	80	8%
PM ₁₀	24-hour	4.88	47	51.88	150	150	150	35%
PM ₁₀	Annual	1.55	16	17.55	50	50	50	35%

Table 4.2 Near-Field Increment Comparison($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Total Project Impact	PSD Class II Increment	Percentage of Class II Increment
NO ₂	Annual	1.51	25	6%
SO ₂	3-hr	0.15	512	0.03%
SO ₂	24-hr	0.08	91	0.1%
SO ₂	Annual	0.02	20	0.1%
PM ₁₀	24-hr	4.88	30	16%
PM ₁₀	Annual	1.55	17	9%

Source: Desolation Flats Natural Gas Field Development Project Final EIS, BLM Rock Springs and Rawlins Field Offices.

The Operator would take measures to minimize impacts to air quality. Non-particulate emissions would be minimized by ensuring that vehicles, rig engines, and similar equipment are maintained in proper operational condition. Watering of Project access roads, as required, would achieve reductions in PM₁₀ particulate emissions of 50 percent (BLM, 2003b, pg 4-11), or better.

4.2.2 The No Action Alternative

Under the No Action Alternative, proposed development would not occur and no Project emissions would be generated.

4.3 SOILS

Issues relating to potential impacts to this resource from development of the Proposed Action were concerned with possible negative impacts to sensitive soils and potential damage to biological soil crusts.

Sensitive soils in the WDNGP are those occupying steeper slopes and the drainage and playa bottoms. Potential for accelerated erosion from steeper slopes and the potential limitations of reestablishing vegetation in disturbed saline and/or sodic soils are the issues of concern arising from proposed implementation of the Proposed Action.

4.3.1 *The Proposed Action*

Implementation of the Proposed Action would result in disturbance to soils from construction of roads, pipelines, and well sites. Anticipated impacts are:

- ⊄ Clearing or mowing of protective vegetative cover at well sites and along pipeline corridors resulting in increased potential for accelerated soil erosion.
- ⊄ Burial and loss of productivity beneath all-season, graveled roads and maintained, graveled well pads.
- ⊄ Mixing of soil materials by pipeline trenching and burial, and by excavation of reserve pits at each well site.

Total maximum, short-term soil disturbance would be approximately 103.4 acres of the approximately 6,400-acre project area for 12 multi-well pads plus pipeline and access roads (87.8 acres for 12 single well pads plus facilities) (**Table 2.3**). Following near-term, post-construction reclamation of those disturbed areas and soils no longer subject to continuing use and disturbance, remaining long-term surface disturbance would total approximately 61.9 acres for both types of facilities. Proposed locations for facilities have been situated in areas of low slopes, and therefore the potential for accelerated erosion would be minimized under the Proposed Action (**Figure 1.2**). The proposed locations avoid drainage bottoms and areas where overland flow could accumulate. Disturbance to potentially saline and/or sodic soils would not occur as neither pipelines nor access roads cross these bottomland soils.

Biological soil crusts are well adapted to severe growing conditions, but poorly adapted to compressional disturbances such as those resulting from trampling or vehicle off-road driving (BLM, 2004, pgs. 2-56 to 2-57). Applicant-committed measures are designed to reduce off-road travel. Total long-term surface disturbance of the Project Area would be approximately one percent. Where biological crusts do occur in the vicinity of the Project Area, they can be adversely impacted or eliminated as a functional component of the soil.

All disturbed soils occupying areas of short-term disturbance would be reclaimed after cessation of drilling and construction of pipelines and access roads per BLM requirements and COAs presented in **Appendix B**. Areas of long-term disturbance would also be reclaimed following the decommissioning of facilities per BLM specifications.

4.3.2 The No Action Alternative

Under the No Action Alternative, none of the proposed activities would occur. Disturbance of soils by oil and gas well drilling and field development would not occur. Grazing-associated impacts would continue at their current levels.

4.4 WATER RESOURCES

Issues relating to potential impacts to this resource from development of the Proposed Action were concerned with possible negative impacts to groundwater resources, in particular possible effects associated with hydraulic fracturing technology.

4.4.1 The Proposed Action

Produced water discharge from the Proposed Action would not adversely affect surface water because there would be no surface discharges. The Spill Prevention, Control and Countermeasure (SPCC) Plan, as required under federal law, has been prepared and submitted for each existing site.

Surface water would be impacted by some short-term erosion. As a result of increased run-off from roads and well pads, there would be some erosion and resulting soil deposition into small intermittent drainages. Mitigation measures would be implemented to reduce these impacts.

Groundwater would not be adversely affected because there would be no surface discharges which would infiltrate into the groundwater system, and because proper drilling practices would be utilized which prevent cross-aquifer contamination from the drill holes. Produced water would be disposed off federal surface in a manner approved by the BLM.

Hydraulic fracturing is a recognized and mature technology widely used within the petroleum industry. Safe fracture stimulation performance would be achieved by ensuring that proper casing and cementing procedures had been followed prior to initiating stimulation. All fracture treatment fluids would flow back from the wellbore and would be recovered, to be disposed off federal surface in a manner approved by the BLM and consistent with WOGCC regulations. Only the target productive horizon would be impacted, within a short radius of the borehole. Data from the WSEO indicate that local stock aquifers occur at depths from near surface to approximately 700 feet. The Project objective horizons are located at depths of 6,000 to 13,000 feet and impermeable or low permeability rock layers occur between the objective horizons and the stock aquifers. No shallow aquifers potentially or actually used for stock watering purposes would be affected. The geologic nature of the target productive formations require the use of hydraulic fracturing techniques to achieve economic success and accomplish the purpose and need of the Project.

4.4.2 The No Action Alternative

Under the No Action Alternative, proposed development would not occur and there would be no Project effects to surface water or groundwater.

4.5 VEGETATION, WETLANDS, AND NOXIOUS WEEDS

Issues of concern regarding implementation of oil and gas field development activities in the WDGNP are the loss of vegetative cover, the successful revegetation of disturbed areas, and the control of non-native noxious weeds.

4.5.1 The Proposed Action

Surface disturbance to vegetative cover would result from construction of well pads, roads, and pipelines. Total maximum, short-term loss of vegetative cover would be approximately 103.4 acres of the approximately 6,400-acre project area for 12 multi-well pads plus pipeline and access roads (87.8 acres for 12 single well pads plus facilities) (**Table 2.3**). Following near-term, post-construction reclamation and revegetation of those disturbed areas no longer subject to continuing use and disturbance, remaining long-term loss of vegetative cover would total approximately 61.9 acres for both multi-well pad facilities and single-well pad facilities. The maintenance of BLM standard roads comprises most of the long-term disturbance. Some permanent loss of vegetation cover would occur where roads are not reclaimed following the decommissioning of oil and gas operations in the Project Area. BLM-approved seed mixes will be applied to areas of disturbance following reclamation activities, including soil preparation, where appropriate.

No impacts to wetlands and riparian areas are anticipated due to their absence in the Project Area.

There is a risk of noxious weed and invasive plant infestation under this alternative. Noxious weed and invasive plant establishment could result from loss of existing vegetative cover and soil disturbance and/or from being brought into the area by vehicles/equipment carrying soil material and seeds picked up in another area infested with noxious weeds. Proposed reclamation and revegetation/reseeding would minimize the potential for noxious weed infestation. Noxious weed or invasive plant species infestations, if identified in the Project Area, would be controlled using BLM-approved methods, as discussed in **Appendix B**.

4.5.2 The No Action Alternative

There would be no additional adverse effects to vegetation from proposed additional oil and gas development under this alternative. However, the potential for noxious weeds or invasive plants to become established may result from other activities associated with existing oil and gas activities and ranching/grazing land uses.

4.6 RANGE RESOURCES AND OTHER LAND USES

4.6.1 *The Proposed Action*

Anticipated impacts to range resources from implementation of the Proposed Action are restricted to a minimal loss of 61.9 acres of forage and associated AUMs, an increased potential for vehicle/livestock collisions, and an increased potential for spread of noxious and invasive weeds for the life of the project. The long-term loss of 61.9 acres of productive vegetation represents a reduction of 1.0 percent of the 6,400-acre Project Area. Livestock grazing would continue during the field development and operational phases of the project. Forage would be reduced in the short-term by a maximum of 103.4 acres until reclamation and revegetation of lands disturbed during drilling and construction activities are completed and a vegetative cover is reestablished.

Within the Project Area, the carrying capacity of the land is estimated at 9-11 acres/AUM (BLM, 2003). Therefore, implementation of the Proposed Action would result in a maximum short-term productivity loss of approximately 10 AUMs and a maximum long-term productivity loss of approximately six AUMs.

4.6.2 *The No Action Alternative*

Under the No Action Alternative, none of the proposed field development activities would occur. Loss of forage for livestock and wildlife due to soil disturbance would not occur. Grazing-associated impacts would continue at their current levels. Impacts from current oil and gas operations would remain for the duration of production.

4.7 WILDLIFE AND FISHERIES

Issues relating to potential impacts to this resource from development of the Proposed Action were concerned with potential effects to wildlife and their habitats.

4.7.1 *The Proposed Action*

Wildlife would be affected by ground-disturbing activities, vehicle travel and drilling, and the presence of increased human activity and machinery operation. The area would continue to be available to wildlife. Big game animals would tend to move away from active construction, resulting in increased forage pressure on nearby areas, but tend to become habituated to facilities and human presence during the production phase of oil and gas projects (BLM, 2003d, pg. 4-185). Avoidance would be reduced once the operation reaches the productive phase; however, levels of surface disturbance and human activity would be somewhat greater than present due to the increased number of wells in the Project Area (BLM, 1987, pg. 50).

Wild horses, especially young foals and pregnant mares, could react to increased noise levels in the area. Wild horses, while present in the vicinity of the Project Area, are infrequent transients (Bargsten, 2004b, personal communication). Animals present within the area are already

acclimated to human presence and disturbance by local existing oil and gas developments. Response to development of the Proposed Action would primarily involve avoidance within the ample available habitat in the vicinity.

No crucial big game winter range or birthing areas are present in this area (WGF, 2002, GIS data).

Short-term and long-term surface disturbance to the Project Area represent 1.4 percent to 1.6 percent and 1.0 percent, respectively. Reduction of available forage and useable habitat is expected to correspond with the extent of surface disturbance planned under this alternative.

4.7.2 The No Action Alternative

There would be no effect to wildlife under this alternative. Livestock grazing would be expected to continue near its present levels.

4.8 SPECIAL STATUS PLANT, WILDLIFE, AND FISH SPECIES

Issues relating to potential impacts to this resource from development of the Proposed Action were particularly concerned with possible effects to sage grouse and mountain plover populations and habitat. Concerns were also expressed regarding the possibility of disruption of sensitive plant communities.

4.8.1 The Proposed Action

4.8.1.1 Federally Listed Species

No threatened or endangered species have been identified in the Project Area and, therefore, no impacts to federally listed species are anticipated. If, during construction of the Proposed Action, a threatened or endangered species is observed, the USFWS would be notified immediately. The affected area would be studied as per protocol and the appropriate mitigation and protective measures implemented.

4.8.1.2 Sensitive Species

Noise, vibrations, and construction caused by the proposed operations could cause white-tailed prairie dogs and other underground-dwellers to temporarily flee to their burrows while equipment is in close proximity. Onsite inspections have resulted in the wells being located to avoid burrows, where possible. Burrows were noted as being present near two of the well sites (12-27, 32-28). Burrows would be avoided during operations and damage (i.e., burrow failure) is not expected. No adverse effects to burrowing mammals are expected.

Construction and operations would occur outside of critical time frames for certain species such as the mountain plover, greater-sage grouse, and raptors; sensitive species which occur or have

the potential to occur in the Project Area. Temporary waivers for the seasonal restrictions to protect sensitive species may be requested by the Operator. These waivers (“exception requests”) are considered on a case-by-case basis by the BLM and WGF. Approval of the temporary waiver requires substantiation that the resource or biota of concern are not present. With timing and avoidance limitations, no impacts to these species are expected. Application of timing limitations or avoidance measures for mountain plover, raptors, and grouse would benefit other sensitive species. Reduction of available forage and useable habitat is expected to correspond with the extent of surface disturbance planned under this alternative.

BLM data show 20 potential raptor nest sites within or adjacent to the Project Area. Nine well sites lie in habitat suitable for raptors and/or raptor nesting. Ferruginous hawks are particularly common. Seven of the Project well sites (12-33, 14-27, 32-28, 12-27, 34-21, 12-29, Haystack 11) lie within one mile of raptor nests identified by the BLM. At least four of the five nests within the Project Area have been identified as belonging to ferruginous hawks. Two well sites (32-32, 32-33) are situated in habitat consistent with raptor nesting and have the potential to contain nests.

Seven well sites (12-33, 32-33, 32-28, 12-27, 34-20, 12-29, Haystack 11) are located in habitat suitable for mountain plover.

Seven of the 12 well sites surveyed exhibit possible sage grouse habitat. Five of those well sites (32-32, 34-29, 12-33, 32-33) lie within two miles of known sage grouse leks (breeding display grounds). The other two well sites (34-28, 14-27) show habitat consistent with sage grouse nesting/lek areas. Observations during the onsite inspection at one well site (34-28) indicated signs of sage grouse in its immediate area.

Of the three special status plant species which may occur in the vicinity of the Project Area, the topographic limitations of two (cedar rim thistle and Gibben's beardtongue) suggests that their habitat, typically on sparsely vegetated slopes, is likely to fall outside of development areas. Similar considerations may apply to Nelson's milkvetch, although the species is also known to occur on alkali clay flats. None of the specific well site locations are in an area identified as habitat for any of these plants.

Site-specific development COAs applying to several sensitive species are indicated in **Appendix B**. Locations of raptor nests and sage grouse leks near the Project Area are indicated in Figure 4.1

4.8.2 The No Action Alternative

There would be no effect to special status species under the No Action Alternative. Ongoing production activities at existing gas wells would occur and activity from livestock grazing would continue.

4.9 RECREATION

4.9.1 *The Proposed Action*

Implementation of the Proposed Action would likely cause the temporary displacement of hunters should drilling and construction coincide with hunting seasons for the various game species present in the Project Area. Displacement is expected to occur over a period of two hunting seasons as a result of construction and drilling activities.

Well drilling, facilities construction, and field operations could impact both hunters and other users due to the additional change in the character of the landscape. Although limited oil and gas facilities and operations are already present in the Project Area, the addition of more wells and facilities will increase visual impacts and will reduce use. Use is expected to be displaced to less affected areas. These effects would diminish with the completion of the drilling and construction phase of development. Some long-term (Project life) displacement of hunters and other users would likely occur from implementation of the Proposed Action. The amount of hunter displacement would coincide with the level of game animal displacement. The Proposed Action is not expected to affect harvest quotas, game hunting season timing or duration, nor harvest success overall.

4.9.2 *The No Action Alternative*

Recreational opportunities would likely remain the same or continue to follow existing trends should the No Action Alternative be implemented.

4.10 VISUAL RESOURCES

4.10.1 *The Proposed Action*

Implementation of the Proposed Action in the Project Area would add facilities and linear features such as roads and pipeline ROWs to an existing landscape that already supports facilities/features of oil and gas development, roads, and livestock grazing at a greater density than otherwise found in the general area. The Proposed Action would result in increased presence on the landscape from construction and operation of facilities and features similar in form, line, color, and texture to those previously introduced man-made features. Increased dust should also be apparent, especially during construction activities. Surface facilities at each well site will be painted a BLM standard environmental color to minimize contrast of colors between background and the proposed facilities.

4.10.2 *The No Action Alternative*

Changes to the landscape and visual resources would not occur with implementation of the No Action Alternative.

4.11 CULTURAL RESOURCES

4.11.1 *The Proposed Action*

Direct impacts to cultural resources would result from construction of well pads, roads, and pipelines. Class III cultural resource inventories have been conducted for all lands proposed to be disturbed, including drillsites, new access roads, and pipelines on a site-specific basis. All sites potentially eligible for listing on the NRHP will be avoided or appropriately mitigated to the satisfaction of the BLM.

Effects to significant cultural resources will be alleviated either by avoidance or by data recovery, or by some combination of the two, as necessary. Avoidance consists of moving or realigning the proposed zone of construction so as to avoid significant sites or significant portions of sites when they are found. Avoidance is almost always the preferred plan of action. While data collection is the most common form of mitigation, if sites are avoided it is rarely necessary for project implementation.

Heritage information within the Project Area would be affected by unanticipated discoveries of cultural artifacts. Every discovery results in some, unavoidable loss of cultural resource information. Such information loss can be partially offset by the imposition of mitigation measures. The effect of mitigation is that information regarding cultural resources which would otherwise remain unavailable would be systematically recorded. Data recovery entails excavation of the site, or portion(s) of the site to be impacted, in a scientific manner by a qualified archaeologist so as to recover the significant element(s) of the site prior to construction of the proposed well, access road, pipeline, etc. Prior to conducting any data recovery, a site-specific data recovery plan must be developed and approved by the BLM in consultation with the SHPO.

Indirect impacts to heritage resources could occur from increased access on Project roads leading to illegal collection activities. Through roads are not proposed, but there may yet be an increase in the amount of illegal collection as a result of increased access provided by the new roads. New road construction would serve to connect well pads to existing roads and, while providing access to humans, would not add to travel through the Project Area.

Native American resources or religious concerns have not been previously identified in the Project Area, but are likely present. Tribal representatives did not respond to the scoping notice with concerns in this area. The BLM will consult with local tribes at the project specific level if sensitive sites are identified as a result of the Class III Inventory.

4.11.2 *The No Action Alternative*

There would be no effect to cultural resources under the No Action Alternative.

4.12 SOCIOECONOMICS

4.12.1 The Proposed Action

The Proposed Action would be planned such that drilling equipment and personnel already located in the area would be utilized. It is not anticipated that an outside temporary and transient workforce would be required. This would alleviate impacts on housing, government services, or facilities. The Project workforce with disposable income would generate spending in the local communities resulting in sales to local businesses with associated tax benefits.

Local sources would be used for the purchase of the materials needed by the operations whenever possible. There would be additional tax benefits, including property taxes on the capital infrastructure (ad valorem tax), gross products tax, and severance tax.

At current rates, the cost to drill and complete each well is approximately \$750,000, resulting in expenditures largely to the local economy of approximately \$9,000,000 from construction of the Project. It is estimated that each of the proposed locations in the Project would recover approximately 4 BCFE (billion cubic feet of gas equivalent) of additional gas reserves (BLM, 1992). These reserves would generate additional royalties and taxes to the federal government, State of Wyoming, and Sweetwater County.

The United States receives a 12.5 percent royalty on the fair market value of gas produced from federal leases, exempting production and transportation costs. Half of federal royalties would be returned to the State of Wyoming. The State of Wyoming collects a six percent severance tax on gas production, exempting federal royalties and production and transportation costs. The state also collects a 4 percent sales and use tax on gross receipts of tangible goods and certain services. Of the funds collected, 28 percent is returned to the local county. For the Proposed Action, assuming 12 wells, expenditures subject to the sales and use tax are estimated to be approximately \$3 million (BLM, 2003a, pg. 4-26).

An estimate of these additional revenues, assuming an average gas price of \$3.00/MCF over the life of the Project, has been indicated in **Table 4.3**.

Table 4.3 WDNGDP Estimated Government Revenues, Life of Project

Revenue Source	Payee	Percentage	Tax Basis	Estimated Government Revenue
Project royalty	United States	6.25%	\$144,000,000	\$9,000,000
Project royalty	State of Wyoming	6.25%	\$144,000,000	\$9,000,000
Severance tax	State of Wyoming	6.0%	\$144,000,000	\$8,640,000
Ad valorem property tax	Sweetwater County (55.95 mills)	6.0%	\$144,000,000	\$8,640,000
Sales and use taxes	State of Wyoming	2.9%	\$3,000,000	\$87,000
Sales and use taxes	Sweetwater County	1.1%	\$3,000,000	\$33,000

Assumes 4 BCFE recovered/well location, \$3.00/MCF constant gas price, current mill levy, project life.

4.13 TRANSPORTATION

4.13.1 The Proposed Action

Implementation of the Proposed Action would result in intermittent and short-term (two years) use of the county and BLM roads providing access to and within the Project Area. Traffic on Bar X and Tipton roads would increase primarily in daylight hours. The intensity of vehicle use would range widely over the two-year drilling and construction period, reflecting type and level of well and facilities development activity. After the wells are drilled and construction and post-construction reclamation activities cease, traffic volume would subside as trips to and within the Project Area reflect reduced activity associated with routine operations by pumpers checking wells in pickups.

4.13.2 The No Action Alternative

Traffic levels would remain at existing levels under this alternative. No additional road construction would occur in the area to provide access to new oil and gas well sites.

4.14 HEALTH AND SAFETY

4.14.1 The Proposed Action

Implementation of the Proposed Action would create a higher level of risk to persons in the area. The increased level of traffic for the two-year drilling and construction period would increase the risk of traffic accidents among oil and gas workers, livestock managers, and recreationists. A slight increase in traffic over existing levels for the period of field operations would result in a proportional increase in potential for traffic accidents for the duration of field operations.

Increasing the mileage of gas gathering pipelines in the Project Area would proportionally increase the potential for pipeline failure. Nationally, accident rates for gas transmission pipelines have historically averaged 86 per year from 1994 through 1998, with fatalities averaging 23 per year over that five year period (USDOT, 1998, online data). During this period, average annual construction rates were approximately 9,200 miles.

The risk of fire/range fire would increase in the Project Area under the Proposed Action due to increased activities associated with industrial, construction activities and the presence of fuels, storage tanks, natural gas pipelines, and other natural gas production facilities. In compliance with BLM requirements and as listed in **Appendix B**, the Proponent is committed to the prevention and suppression of fires on public lands caused by its employees, contractors, or subcontractors and to the immediate reporting of any wildland fire to the BLM.

To minimize risks to health and safety of individuals in the WDNGP, the Proponent would operate in compliance with BLM, OSHA, DOT, and WOGCC. The Proponent is also committed

to complying with standard methods of handling any waste materials in compliance with methods outlined by the BLM in Appendix B.

4.14.2 The No Action Alternative

Implementation of the No Action alternative would result in no change to the existing health and safety characteristics of the area.

4.15 NOISE

4.15.1 The Proposed Action

Noise associated with drilling and facilities construction over a two-year period of development would be increased near these operations when these individual activities occur. Drilling and facilities construction activities and associated increased noise levels would be temporary, lasting as long as the activities were ongoing at well sites and along access road and pipeline ROWs.

EPA has established a level of 55 dBA as a guideline for acceptable environmental noise. A noise level of 60 dBA is generated between two people engaged in normal conversation standing five feet apart. Anticipated background noise levels in rural areas is anticipated to be approximately 40 dBA. Given that the Project Area is subject to frequent winds, the natural noise levels in the Project Area may approximate 50 dBA during the daylight hours (BLM, 2003d, pg. 4-330). Wind typically adds 5 to 10 dBA. Damage to the unprotected human ear can occur at noise levels of 115 dBA and above (Farmingdale State University, 2004, online data). The 55 dBA EPA standard represents very low noise levels and indicates the level below which no environmental effects could reasonably be expected.

Based on an average noise level of 85 dBA measured at 50 feet from a typical construction site, the expected noise levels would be 85 dBA at 50 feet, 65 dBA at 100 feet, 59 dBA at 500 feet, 55 dBA at 1,500 feet, and 53 dBA at 2,000 feet from the construction equipment. The typical noise level associated with an operating drilling rig is 74 dBA at 200 feet (USGS, 1981). Noise from a typical drilling rig would decrease to 60 dBA at 1,000 feet, to 57 dBA at 1,500 feet, and to 54 dBA at 2,000 feet. Therefore, an area of somewhat less than 288 acres around a typical drilling site would temporarily experience noise levels in excess of the EPA standard. An area of approximately 72 acres around each drilling location would experience temporary noise levels in excess of those associated with normal human conversation. The absence of any residence or human receptor likely to experience extended noise levels associated with oil and gas development under the Proposed Action minimizes potential impacts due to temporary and intermittent increases in noise levels for the duration of drilling and construction activity. Wildlife-associated impacts are also discussed in Section 4.8, including displacement and disturbance.

4.15.2 The No Action Alternative

Implementation of the No Action Alternative would result in no additional noise in the Project Area from drilling of oil and gas wells and associated construction and operations on federal

lands. Noise levels would continue in response to natural conditions and ongoing human activity.

4.16 CUMULATIVE IMPACTS

Cumulative effects are those determined by summarizing the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions in the Area of Influence (AOI). The AOI varies by resource. Cumulative effects can be identified both quantitatively and qualitatively, by magnitude of single actions, by the number of single actions combined, and by a time period in which the actions occur and have an effect on the environment.

Past and existing activities on or in the vicinity of the Project Area that have a major influence on the resources in the area include:

- ≠ Oil and gas exploration, production, and transport
- ≠ Livestock grazing activities (including fences, stock watering facilities, etc.)
- ≠ Recreation activities, principally hunting

Responses to the scoping notice for the Proposed Action expressed concerns relating to the cumulative effects of natural gas development activities when combined with other ongoing and proposed developments on lands within the BLM Rawlins Field Office area.

Increasing natural gas prices, geophysical exploration requests, and oil and gas development trends suggest that further environmental impacts in the Great Divide Basin would occur from oil and gas development, including potential CBNG development. Large increases in grazing and recreational pressures are not foreseen. Therefore, this discussion will focus on the effects of additional oil and gas development.

Existing petroleum fields located within six miles of the Project Area, all of which produce gas and condensate, are indicated in **Table 4.4**.

Table 4-4 Existing Oil and Gas Fields Near the WDNGDP

Field	Reservoir(s)	Discovery	Completed Wells	APDs and Spuds
Hay Reservoir	Lance, Lewis, Almond, Mesaverde	1977	61	4
Bush Lake	Lance, Lewis, Almond, Mesaverde	1978	ABD	0
Nickey	Lewis, Almond	1980	2	0
Gale	Lewis, Ericson	1980	2	0
Great Divide	Lance, Lewis	1978	9	0
Red Desert	Lewis, Mesaverde	1971	27	3
Lost Creek Basin	Lewis, Ericson, Mesaverde	1976	0	0

Source: WOGCC (2004). ABD indicates abandoned field.

The BLM is analyzing a number of potential oil and gas development projects within the Great Divide Basin. These projects are summarized in **Table 4.5**.

Table 4.5 Potential Oil and Gas Development Projects, Great Divide Basin

Name	Reservoir	Proposed Wells	Status
Continental Divide/Wamsutter II Natural Gas Project	Almond, Lewis, Mesaverde	3,000	EIS ROD signed 2000. Approximately half of the analysis area covers the Great Divide Basin. Located directly south of the Project Area. 2,130 wells authorized pending planning review of the Great Divide Resource Area RMP by the Rawlins Field Office.
Wind Dancer Natural Gas Development Project	Lance, Lewis, Mesaverde	12	Analysis area of 6,400 acres. EA in preparation. Comprises the Project Area.
Hay Reservoir CBNG	Ft. Union	8	Analysis area of 1,280 acres. EA in preparation. Six miles south of Project Area.
Lower Bush Creek CBNG	Ft. Union	20	EA in preparation, 20 producing wells plus 2 injection wells. 7-10 miles northwest of Project Area.
Hay Reservoir Natural Gas Infill Drilling	Almond, Lewis	25	EA in preparation. Adjoins Project Area on the west.
Scotty Lake CBNG	Ft. Union	18	EA for pilot project, 18 wells over 3,000 acres, 3 current producing from re-entries. 12 miles north of Project Area.

Source: BLM Rawlins Field Office (2004).

In addition to the above drilling projects, the BLM Rawlins Field Office is considering or has approved three geophysical projects within the vicinity of the Project Area, the Hay Reservoir 3D Seismic Survey, the Osborne Springs 3D Seismic Survey, and Wind Dancer 3D/2D Seismic Survey projects.

4.16.1 Geology, Minerals, and Paleontology

The AOI for geology, minerals, and paleontology would be the Project Area.

Existing, proposed, and reasonably foreseeable actions would not add to the level of geological hazards in the Project Area.

Existing and foreseeably developable mineral resources within the vicinity of the Project Area are restricted to oil and gas development. Development of oil and gas resources would result in minor alterations to the existing topography. The bulk of these resources within the vicinity of the Project Area would be developed on BLM surface or minerals and would require adherence to BLM reclamation stipulations. Standard stipulations, augmented by site-specific COAs, would effectively mitigate minor levels of topographic disturbance.

Ongoing development would have the potential to negatively impact paleontological resources. However, BLM requirements for the protection of such resources would effectively mitigate

potential losses of fossil information. Net effects to paleontological resources are expected to be positive, with the potential for discoveries of significant fossils resulting from development.

4.16.2 Air Quality

The AOI for air quality would encompass the Great Divide Basin. Cumulative effects of development to air quality could conceivably affect a larger area than for any other resource.

Ongoing development of oil and gas resources within the Great Divide Basin would negatively impact air quality through increased criteria pollutant emissions associated with machinery engines and compressors, as well as from fugitive dust resulting from increased development-associated vehicular traffic. Most of the effects from seismic surveys would be limited to increases in fugitive dust emission. Cumulative impacts from the Proposed Action would be similar to those analyzed for the Continental Divide/Wamsutter II Natural Gas Project EIS (BLM, 2000) and the Desolation Flats Natural Gas Field Development Project FEIS (BLM, 2004). The Proposed Action would be responsible for relatively lower levels of emissions since additional compression is not planned.

As discussed in Section 4.2.1, previously, air quality modeling for the Desolation Flats FEIS suggests that air impacts from the Proposed Action would be below applicable federal and state standards. The Project would represent a very small fraction of emissions resulting from increased oil and gas development within the Great Divide Basin. As detailed in Section 4.2, there will be small but measurable effects in the immediate Project Area, small but measurable effects in the near field, and this project will incrementally contribute to a reduced far field visibility effect.

Cumulative air quality impacts would include emissions from nearby oil and gas production, such as the adjacent Hay Reservoir Unit. Disturbances associated with such fields will decline over time. At Hay Reservoir, 16 wells have been abandoned and reclaimed, reducing disturbance levels. Modernization of facilities, including replacement of numerous, small compressors with three modern, lean-burning Western Gas compressors, has also acted to reduce overall emissions levels (WOGCC, 2004, online data; Webb, 2004, personal communication).

4.16.3 Soils

The AOI for soils consists of the Project Area, including five existing and 12 proposed wells and ancillary facilities.

Cumulative soils impacts from past, present, and reasonably foreseeable activities combined with the Proposed Action would consist principally of soil impacts from on-going oil and gas production and exploration and development activities, continuing livestock management activities, and seasonal recreational/hunting activities. The drilling of approximately 12 wells and associated construction of ancillary facilities including roads and pipelines would contribute both short-term and long-term impacts in the form of soil disturbance for the life of the oil and gas projects. Total long-term cumulative surface disturbance would be approximately 63 acres. In combination with appropriate livestock use, off-road vehicle activity, primarily during hunting

seasons; implementation of standard stipulations and site-specific construction and reclamation procedures for oil and gas facilities would minimize the cumulative impacts to soils.

4.16.4 Water Resources

The AOI for surface water resources would be limited to several local watersheds in the vicinity of the Project Area. These include the Red Creek-Rocky Crossing watershed, comprising approximately 24,000 acres along Red Creek on the north side of the Project; the Red Creek-Cronin Draw watershed, comprising approximately 12,000 acres along lower Red Creek to the west and southwest; and the Lower Lost Creek - Lost Creek watershed to the south and southeast, comprising more than 61,000 acres around and southeast of Lost Creek dry lake.

CBNG development at Scotty Lake, within the Red Creek watershed to the north of the Project Area, could contribute produced water to the Red Creek drainage, if surface discharge is used for disposal. The project is a pilot development consisting of 18 potential wells. Volumes of produced water are anticipated to be small (less than 3 cfs), and it is likely that infiltration would prevent any discharge from reaching the Project Area. The Kennedy Hay Reservoir CBM pilot to the south is located within the North Red Desert Basin watershed, which is isolated from the Red Creek watershed, and would not contribute to cumulative impacts. All streams within the Great Divide Basin are internally drained and waters of the Colorado River System would not be affected. Neither the Wind Dancer nor the Hay Reservoir conventional gas development projects would cause additional effects to surface water since no surface discharge is proposed for either. The same situation is true for other gas fields located within watersheds located adjacent to the Project Area, including the Nickey and Gale fields.

As indicated in Section 4.4.1, impacts to surface water from the Proposed Action would be limited to some short-term erosion as a result of increased run-off from roads and well pads. There would be some resulting soil deposition into small intermittent drainages. Mitigation measures would be implemented to reduce these impacts. Therefore, no cumulative effects to surface water resources are anticipated for this alternative.

The AOI for groundwater resources would be the Great Divide Basin.

As discussed in Section 3.4.2 previously, groundwater flow is generally toward the basin center, which is located near the Project Area. CBNG developments could impact groundwater resources through withdrawal of groundwater and/or infiltration of produced water if surface discharge is used for disposal. The Scotty Lake, Lower Bush Creek, and Hay Reservoir CBNG pilots total 46 proposed wells. Potential volumes of produced water are unknown and disposal methods are undetermined at this time, precluding a more quantitative estimated of potential groundwater effects.

As discussed in Section 4.4.1 previously, the Proposed Action would not cause impacts to groundwater resources since no surface discharge is planned and no infiltration would result. Any Project produced water would be trucked from the location to an approved disposal site not located on federal surface. Required drilling, completion, and stimulation practices would

protect aquifers from damage from wellbores or cross-contamination between aquifers. No cumulative effects are anticipated for this alternative.

4.16.5 Vegetation, Wetlands, and Noxious Weeds

The AOI for vegetation consists of the Project Area, including five existing and 12 proposed wells and ancillary facilities.

Cumulative impacts on vegetation from past, present, and reasonably foreseeable activities combined with the Proposed Action would consist principally of loss of vegetative cover and opportunities for noxious weed infestation from on-going oil and gas production and exploration and development activities, continuing livestock management activities, and seasonal recreational/hunting activities. The drilling of approximately 12 wells and associated construction of ancillary facilities including roads and pipelines, in addition to disturbances associated with five existing wells and facilities, would contribute both short-term and long-term impacts in the form of loss of vegetative cover for the life of the oil and gas projects. Total cumulative long-term surface disruption would be approximately 63 acres. In combination with appropriate livestock use and off-road vehicle activity, primarily during hunting seasons; implementation of standard stipulations and site-specific construction and reclamation procedures for oil and gas facilities would minimize the cumulative impacts to vegetation and would minimize potentials for weed infestation and spread.

4.16.6 Range Resources and Other Land Uses

The AOI for range resources consists of the Cyclone Rim Allotment area of approximately 308,000 acres.

Cumulative impacts on livestock and big game management from past, present, and reasonably foreseeable activities combined with the Proposed Action would consist principally of the previously described loss of vegetative cover, increased potential for noxious weed infestation, and subsequent reduction in available forage. These impacts would result from on-going oil and gas production and exploration and development activities, and to a lesser degree the continued grazing of lands and use for recreational hunting. The drilling of approximately 12 wells and associated construction of ancillary facilities including roads and pipelines, in addition to disturbances associated with five existing wells and facilities, would contribute both short-term and long-term impacts in the form of loss of vegetative cover and forage for the life of the oil and gas projects. Total cumulative long-term surface disruption would be approximately 63 acres. Existing oil and gas development within the Cyclone Rim Allotment is approximately 147 wells (WOGCC, 2004a, GIS data). As discussed in Section 4.16.7, average per well long term surface disturbance for oil and gas development within the Great Divide Basin averages approximately 4.9 acres/well. Three foreseeable oil and gas projects occur within the Cyclone Rim Allotment, the Hay Reservoir and Scotty Lake CBNG projects and the Hay Reservoir Unit Natural Gas Infill Drilling Project, totaling 51 wells. Therefore, planned, existing, and foreseeable long-term surface disturbance within the Cyclone Rim Allotment from oil and gas development is approximately 1,033 acres. Based upon the estimated carrying capacity of the land in the Project Area of 9-11 acres per AMU, cumulative long-term effects are estimated at

approximately 103 AUMs. This represents approximately 0.3 percent of the total of the 40,661 AUMs in the allotment (Bargsten, 2004a, personal communication). In combination with appropriate livestock use and off-road vehicle activity, primarily during hunting seasons, implementation of standard stipulations and site-specific construction and reclamation procedures for oil and gas facilities would minimize the cumulative impacts to forage availability.

4.16.7 Wildlife and Fisheries

The AOI for wildlife species would vary greatly in extent. Small, terrestrial mammals would not travel far from current habitat and impacts would be restricted to the Project Area. Big game species have the capability of roaming over much greater areas. For this EA, varying AOIs have been selected, as indicated in **Table 4.6**.

Table 4.6 Areas of Influence Used for Cumulative Impacts Analysis

Species	Area of Influence	Rationale
Big game	WGF herd unit	Potential range of herd
Raptors	Project Area + 1 mile buffer	Current nest stipulation
Sage grouse	Project Area + 2 mile buffer	Current lek stipulation
Other birds	Project Area + 1 mile buffer	Based on raptor stipulation
Smaller mammals	Project Area	Limited mobility for smaller species
Aquatics	Streams and wetlands in project vicinity	Not present this project
Sensitive plants	Project Area	Limited mobility, habitat

Cumulative impacts to wildlife may result from harassment resulting from increased human access and presence, destruction of forage, increased mortality from collisions with vehicles, and fragmentation of habitat. The low levels of surface disturbance associated with most conventional oil and gas development projects would not necessarily guarantee a negligible level of impacts to wildlife. Several proximal projects occurring simultaneously could magnify the effects of the individual developments by hindering the ability of wildlife to relocate away from individual sources of disturbance.

Because of the size and range of herd units in the Great Divide Basin, cumulative impacts analysis required investigation of foreseeable oil and gas development projects on BLM land in areas under the jurisdiction of the Rock Springs and Lander field offices. The levels of surface disturbance from existing oil and gas development over the extent of each herd unit was estimated, based upon long-term disturbance information from recent NEPA analyses. No current or foreseeable projects from the Lander Field Office coincide with Project big game herd units. Two current projects from the Rock Springs Field Office with approximately 116 acres of long-term disturbance were included. For the Rawlins Field Office, the projects listed in **Table 4.5** were included, with the assumption that approximately half of the wells authorized under the Continental Divide/Wamsutter II Natural Gas Project would be located within the Great Divide Basin. A further assumption was that each location would contain a single wellbore, which is likely to be correct in most cases. Based upon all of the data, long-term disturbance from

foreseeable oil and gas development within the extent of Project herd units was estimated to approximate 4.9 acres/well for approximately 1,235 wells, for a total foreseeable impact of approximately 5,750 acres.

The Proposed Action would likely result in minimal impacts to the elk population as elk are infrequent visitors to the vicinity of the Project Area (WGF, 2002, GIS data). The local elk population belongs to the 2.5 million acre Herd Unit Area 426 (Steamboat). Within the Steamboat Herd Unit Area, elk are mainly concentrated within the central region, whereas the Project Area occupies the center of a large (700,000 acres) area of infrequent visitation to the east. The nearest crucial winter/year-long range occurs in a 25,000 acre area located approximately six miles to the southwest. Within the Steamboat herd unit, existing oil and gas development includes approximately 1,103 wells (WOGCC, 2004a, GIS data). At an average long-term disturbance of 4.9 acres/well, plus 5,750 acres of foreseeable disturbance, total existing and foreseeable disturbance would be approximately 11,150 acres. Project long-term disturbance of 62 acres represents 0.6% percent of the existing and foreseeable disturbance.

The entire vicinity of the Project Area, and almost all of the 2.16 million acre Herd Unit Area 615 (Red Desert), comprises antelope winter/yearlong range. Antelope move freely over the area and have forage options beyond disturbance areas. Crucial winter range is located only along the southern eastern margins of the Herd Unit Area, more than 20 miles beyond the Project Area (WGF, 2002, GIS data). Impacts are not anticipated. Within the Red Desert herd unit, existing oil and gas development includes approximately 1,512 wells (WOGCC, 2004a, GIS data). At an average long-term disturbance of 4.9 acres/well, plus 5,750 acres of foreseeable disturbance, total existing and foreseeable disturbance would be approximately 13,150 acres. Project long-term disturbance of 62 acres represents 0.5 percent of the existing and foreseeable disturbance.

The local mule deer population belongs to the 2.5 million acre Steamboat Herd Unit Area. Mule deer are infrequent visitors to the Project Area, with the exception of identified spring/summer/fall range in the area immediately around and southwest of Hay Reservoir. This local population inhabits a 27,000 acre area near the center of an infrequent visitation range of approximately one million acres extent (WGF, 2002, GIS data). The nearest crucial winter range is located more than 30 miles to the west. Oil and gas development from the Proposed Action, the Hay Reservoir Natural Gas Infill Drilling Project, and the Kennedy Hay Reservoir CBM Pilot would occur within the approximate 42 square mile area of spring/summer/fall mule deer range. Approximately 53 existing, and an estimated 29 proposed wells would be located within this range. Based upon average long-term disturbance levels for the Proposed Action of approximately 3.7 acres per well location, total long-term cumulative impact from existing and proposed oil and gas development would be approximately 303 acres, or approximately one percent of the local mule deer range. Within the entire Steamboat herd unit, existing oil and gas development includes approximately 1,265 wells (WOGCC, 2004a, GIS data). At an average long-term disturbance of 4.9 acres/well, plus 5,750 acres of foreseeable disturbance, total existing and foreseeable disturbance would be approximately 11,950 acres. Project long-term disturbance of 62 acres represents 0.5 percent of the existing and foreseeable disturbance.

CBNG pilot developments near the Project Area are probably too remote to add to wildlife effects for most terrestrial species from the Proposed Action, other than big game populations. The Hay Reservoir Natural Gas Infill Drilling Project, located immediately adjacent to the Project Area, and which is likely to be constructed more or less simultaneously with the Proposed Action, could potentially magnify the effects of surface disturbance. Cumulative long-term surface disturbance from existing and proposed wells and ancillary facilities within the Project area is approximately 124 acres, or 1.9 percent of the Project Area.

4.16.8 Special Status Plant, Wildlife, and Fish Species

The cumulative impacts areas of influence for certain sensitive species are indicated in **Table 4.6**.

An active sage grouse lek is located immediately adjacent to the Project Area and eight leks have been identified within 10 miles. Fifteen existing wells and ancillary facilities are located in a two mile buffer around the Project Area, with an approximate long-term surface disturbance of 78 acres. An estimated 7 future wells are likely to be drilled within two miles of the Project Area within the Hay Reservoir Unit, with an estimated long-term disturbance of approximately 36 acres. Total long-term surface disturbance from existing and foreseeable oil and gas development within the Project Area and a two mile buffer is approximately 238 acres, or 0.8 percent of the area.

The situation for raptors, principally ferruginous hawks, is similar to that for sage grouse. Numerous nests have been identified within the general vicinity of the Project Area. Stipulations on development imposed by BLM would act to protect raptors. Three existing wells and ancillary facilities are located in a one mile buffer around the Project Area, with an approximate long-term surface disturbance of 16 acres. An estimated one future well is likely to be drilled within one mile of the Project Area within the Hay Reservoir Unit, with an estimated long-term disturbance of approximately five acres. Total long-term surface disturbance from existing and foreseeable oil and gas development within the Project Area and a two mile buffer is approximately 145 acres, or 0.9 percent of the area.

Fish species are not known from the vicinity of the Project Area and Red Creek, which crosses the western edge of the Project Area, is a Class 4 stream.

The habitat for sensitive plant species which may occur in the Project Area is likely to be outside of the locations of most oil and gas facilities. Cumulative long-term surface disturbance from existing and proposed wells and ancillary facilities within the Project area is approximately 124 acres, or 1.9 percent of the Project Area. The required application of existing USFWS and BLM mitigation measures is expected to reduce any potential impacts to sensitive plant species which may occur in the Project Area.

4.16.9 Recreation

The AOI for recreational resources would include the Project Area and a surrounding buffer area. The buffer would encompass an area in which certain wildlife species, notably big game

and raptors, could be temporarily displaced by, principally, construction and drilling activities. The size of the buffer is estimated to be a maximum of two miles. Total long-term surface disturbance from existing and foreseeable oil and gas development within the Project Area and a two mile buffer is approximately 238 acres, or 0.8 percent of the area, as discussed in Section 4.16.8.

Cumulative impacts of implementing the WDGNDP in combination with past, present, and reasonably foreseeable activities would affect recreational activities within the Project Area and beyond. Within the Project Area, the addition of roads to the existing network would facilitate roaded travel for recreationists/hunters to more parts of the Project Area. Disturbance from operations and construction may temporarily displace game animals and hunters. This displacement would be short-term.

4.16.10 Visual Resources

The AOI for visual resources would be areas within visual range of the Proposed Action, principally an area within approximately one mile of the Project Area.

As previously discussed in Section 3.10, existing visual qualities in the WDNGDP and adjacent lands have already been affected by ongoing oil and gas development, including road building and pipeline construction. Livestock management and recreational uses have also contributed less noticeable features to the visual quality of the Project Area and adjacent lands including fences and off-road tracks in addition to use of the existing road network. The Proposed Action along with ongoing and proposed oil and gas projects in and adjacent to the Project Area would add to the level of impact to visual resources in the immediate area. However the added features of the WDNGDP would be consistent with the existing well site, roads, and reclaimed pipeline features in line, form, color, and texture; and would still be consistent with the current VRM Class 3 designation with implementation of standard best management practices for all oil and gas projects including specifically the mitigation measures proposed in Chapter 2 and **Appendix B** of this EA. Cumulative impacts on visual resources are expected to occur.

4.16.11 Cultural Resources

The AOI for cultural resources is the Project Area.

Provisions of the National Historic Preservation Act and other regulations require identification and protection of heritage resources on public lands. In compliance with these requirements, oil and gas operators have conducted or would conduct archeological inventories prior to development. Cultural sites would be identified and in most cases avoided. Where avoidance is impossible, mitigation measures would protect or recover information about the site. The completion of these inventories would result in an increase in heritage information and a beneficial impact.

4.16.12 Socioeconomics

The AOI for socioeconomics is Sweetwater and Carbon counties, including the communities of Rawlins, Rock Springs, and Wamsutter.

With the completion of several programmatic NEPA analyses covering oil and gas development in the Green River, Great Divide, and Washakie basins, southwestern Wyoming is likely to experience an increase in the levels of natural gas development activities.

As discussed in Section 3.12 previously, both counties and the municipalities of Rock Springs and Rawlins have experienced net population losses over the last decade. This suggests that municipal infrastructures would be able to accommodate any limited and temporary population increases associated with initial phases of expanded oil and gas development, including the Proposed Action. Should economic conditions continue to favor development, it is possible that infrastructure upgrades would be required by local governments and housing shortages could occur. The community of Wamsutter has experienced a nearly 9 percent population growth in the last decade, potentially resulting in local housing shortage. However, the very small size of the town (261, 2000 census) and the availability of temporary housing units suggest that initial phases of expanded gas development would have minor negative impacts to Wamsutter.

Ongoing and expanded gas development in southwestern Wyoming could affect the attitudes of local populations by visually altering the landscape and possibly displacing recreational opportunities.

Overall, the Proposed Action and other currently-active gas development projects would have a beneficial effect on government revenues, local employment, and local merchandising.

4.16.13 Transportation

The AOI for transportation issues would include the I-80 corridor and roads reaching the vicinity of the Project Area from I-80, principally Bar X, Tipton, and Luman roads.

These roads provide adequate capacity for existing uses, principally recreational hunting and livestock ranching in addition to oil and gas production. Foreseeable increases in natural gas development could result in higher maintenance requirements for gravel-surfaced roads north of I-80. Large increases in oilfield traffic associated with oil and gas development in both the Great Divide Basin to the north and the Washakie Basin to the south could result in increased maintenance requirements for I-80.

4.16.14 Health and Safety

The AOI for health and safety issues would be similar to that for transportation, described in Section 4.16.13.

The most likely sources of risks to human health and safety are anticipated to be from potential industrial accidents associated with drilling and completion activities and pipeline construction,

and from potential vehicular accidents associated with increased traffic on Project access routes. Cumulative impacts are expected to be those described for the Proposed Action.

4.16.15 Noise

The AOI for noise would be the Project boundary plus a 2,000 foot buffer, which would encompass the area within which noise during drilling operations would exceed the EPA standard, as discussed in Section 4.15.1.

No cumulative effects from noise above or beyond those discussed in Section 4.15.1 are expected.